APRIL 1980
No. 4

FISHING INFORMATION

Southwest Fisheries Center-La Jolla, California

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APRIL 1980
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FISHING INFORMATION

1980

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NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST FISHERIES CENTER
8604 LA JOLLA SHORES DRIVE - P. O. BOX 271
LA JOLLA, CALIFORNIA 92037

FISHING INFORMATION

APRIL 1980, No. 4

EDITOR: JAMES A. RENNER

I. Barrett, Director, SOUTHWEST FISHERIES CENTER
J. Carr, Deputy Director

PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at $2^{o}F$ ($1^{o}C$) intervals) from Baja California to Vancouver Island out to about $135^{o}W$. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

To cancel delivery of this publication in the event you no longer need to receive it, or to change the delivery address if you are moving but still need to receive it, please notify us by writing: James A. Renner, Editor, Fishing Information, National Marine Fisheries Service, Southwest Fisheries Center, P. O. Box 271, La Jolla, California 92038.

Submitted for publication- May 30, 1980

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ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15-day Supplement)

TECHNICAL EDITOR:
R. Allen

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R. Allen, H. Orr

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  J. Redhead at Langara Island Light;
  R. Dobinson at Cape St. James Light;
  R. W. Moe at Kains Island Light;
  M. V. Stewart at Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

During April the subtropical high pressure center normally shifts northward to 35°N, 150°W and the Aleutian low pressure system is usually centered in the northwest part of the Gulf of Alaska (Figure 1). Maximum westerly surface winds and intense mixing of the ocean surface layers normally occurs along the north Pacific between 45°N and 50°N. Sea surface temperatures (SST's) normally begin to reflect seasonal warming over most of the north Pacific.

During April 1980 the Aleutian low was centered near its normal position at 55°N, 155°W, but pressures around the center were 12 to 16 millibars below normal. The subtropical high pressure center was several hundred miles southwest of its normal position (Figure 2). Because of below normal pressures in the Aleutian low system and near normal pressures in the high, westerly surface winds were 4 to 8 knots above normal between 35°N and 50°N. In the Gulf of Alaska and along the west coast north of 40°N, surface winds were 3 to 6 knots above normal. In these areas of higher than normal winds, ocean mixing was extensive and SST's were cooling. Normally, SST's would show a slight seasonal increase in this region.

The SST pattern (Figure 3) around 40°N began to show some organization in the north Pacific frontal boundary which had been very weak for several months. The area with SST's more than 1°C below normal expanded northeastward from March to April under the influence of heavy cloudiness and strong ocean wind mixing during weather frontal passages. Because the eastern Pacific high was displaced westward, several frontal systems associated with heavy weather and winds moved across the United States' west coast as far south as Baja California with significant rainfall over the southwest. Reestablishment of the high pressure system along the west coast with strengthened northerly winds, produced cooling in the surface layer east of 140°W, especially along the coast south of 40°N. As a result, the existing large area of positive SST departures more than 1°C diminished in size during April. Coastal SST's were actually below normal from San Francisco to San Diego. This was the first month since August 1979 that SST's have cooled to below normal values along the coast of California. However, a large body of water from 25°N to 35°N and east of 135°W remained more than 1°C above normal. This pool of warm water extends southeastward to Baja, California (Figure 5). Although surface winds are about normal for April, it will be at least two months before the large body of warm water returns to normal temperatures off southern California and Baja. Except for areas where SST's were definitely above normal in April 1980, SST's were colder than one year ago over much of the eastern Pacific (Figure 7). The effect of a prolonged period with warm SST's from southern California and Baja California to Hawaii during the fall and winter of 1979-80 are reflected in the positive SST difference pattern in Figure 7.

Western North Pacific

During April 1980 the Aleutian low extended into the northwest Pacific and dominated the circulation over the north Pacific north of 40°N. The subtropical high pressure system was centered along 30°N and was a greater influence south of 35°N in the western Pacific than during the previous four months. As a result of the lighter winds and clearer skies in the widespread high pressure system, SST's increased at above seasonal rates, and the area south of 35°N which had been covered by negative departures greater than 1°C decreased markedly during April. Between southern Japan and the coast of China, a strong SST gradient developed between the cold waters in the north China sea and the above normal SST's northwest of Formosa (Figure 4). East of northern Honshu, Japan and south of 40°N, an area covered by positive SST departures expanded eastward, probably due to the increased northward movement of warm water in the Kuroshio Current. North of 40°N, there has been a significant increase in areas covered by negative SST departures more than 1°C. South of Kamchatka and the western part of the Aleutian Islands, strong winds around the Aleutian low generated extensive wind mixing in the ocean surface layer. The resulting positive and negative SST's departure patterns near 40°N reflected strong horizontal temperature gradients which resulted in a strengthened north Pacific Ocean front (Figure 4).

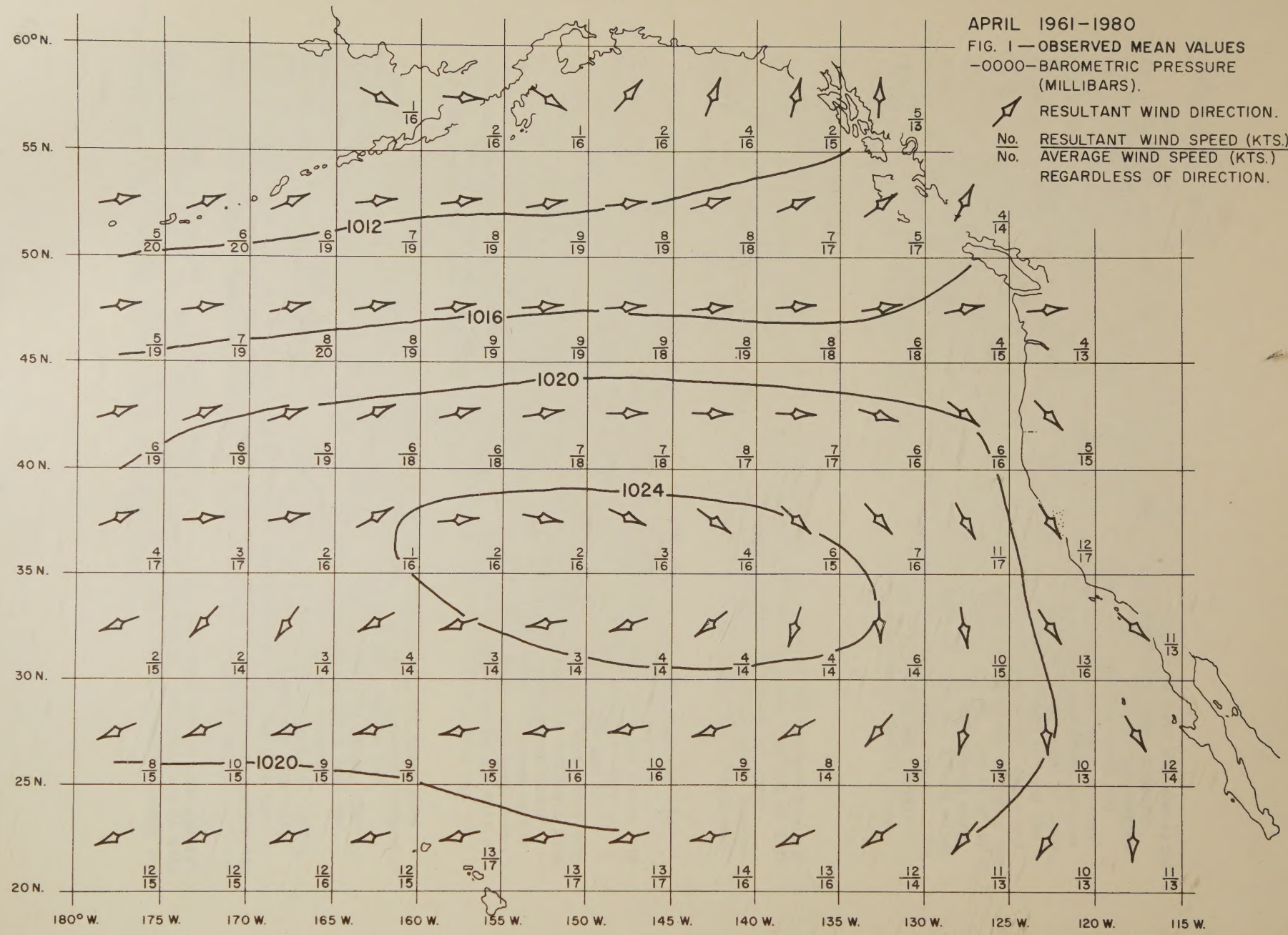
Eastern Tropical Pacific

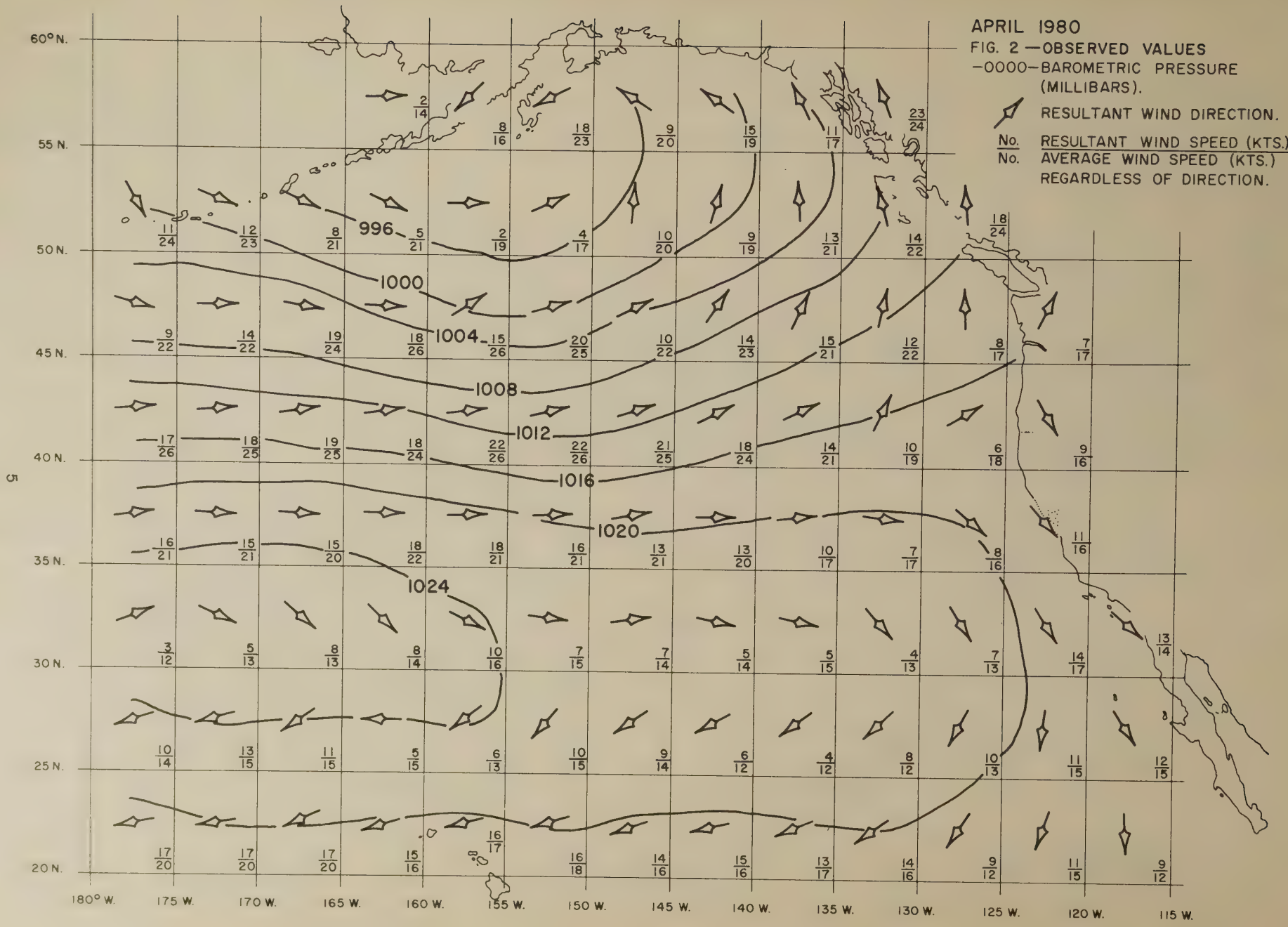
During April SST's normally increase less than 1°C over most of the eastern tropical Pacific in the northern hemisphere. In the southern hemisphere, seasonal cooling of 1 to 2°C usually takes place at the surface of the Peru Current along the coast of South America. SST's decrease about 1°C along the equator from 5°N to 5°S. The ocean frontal boundary (north-south SST gradient) along the equator between the Galapagos Islands and Ecuador normally strengthens in April.

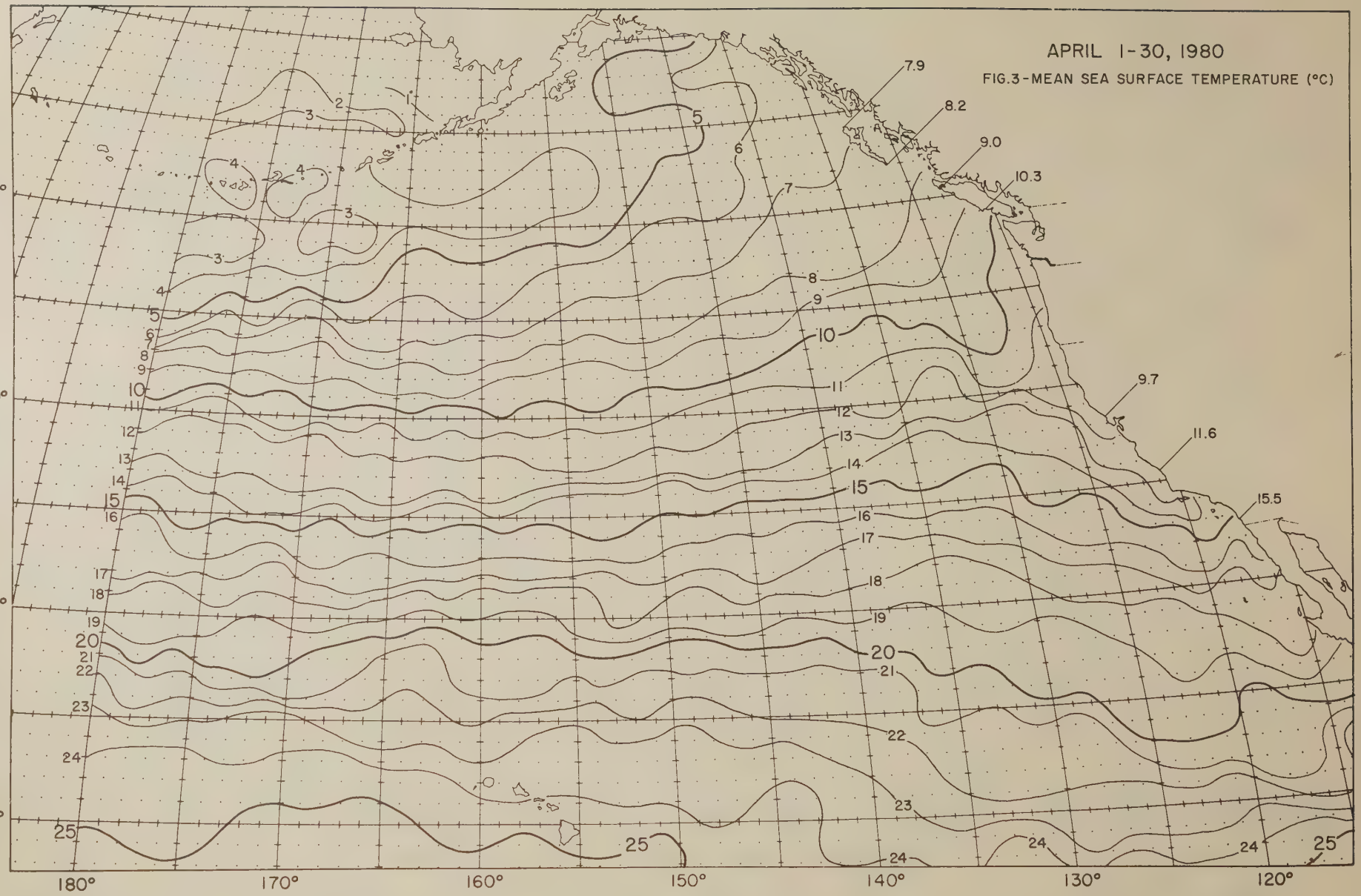
In April 1980 the SST gradient east of 130°W between 25°N and 20°N weakened from March to April, especially off the southwest coast of Baja California (Figure 8). However, tuna fishing remained active in the local banks area between Cape San Lucas, the Revillagigedo Islands and the west coast of Mexico at 23°N. West of Baja California, SST's remained more than 1°C above normal over a large region between 112°W and 130°W (Figure 9). However, the area south of 25°N covered by positive SST departures more than 1°C decreased markedly as the northeast trade winds strengthened along the southeast side of the high pressure system. A large part of the tropical Pacific experienced above normal SST's, but there were no other large areas with SST's more than 1°C above normal north of the equator. There were three areas east of 100°W where SST's were more than 1°C below normal due to persistent wind mixing south of Mexico along 95°W and in the Gulf of Panama. The other area with negative departures along 10°N west of Costa Rica was apparently associated with upwelling (Figure 9).

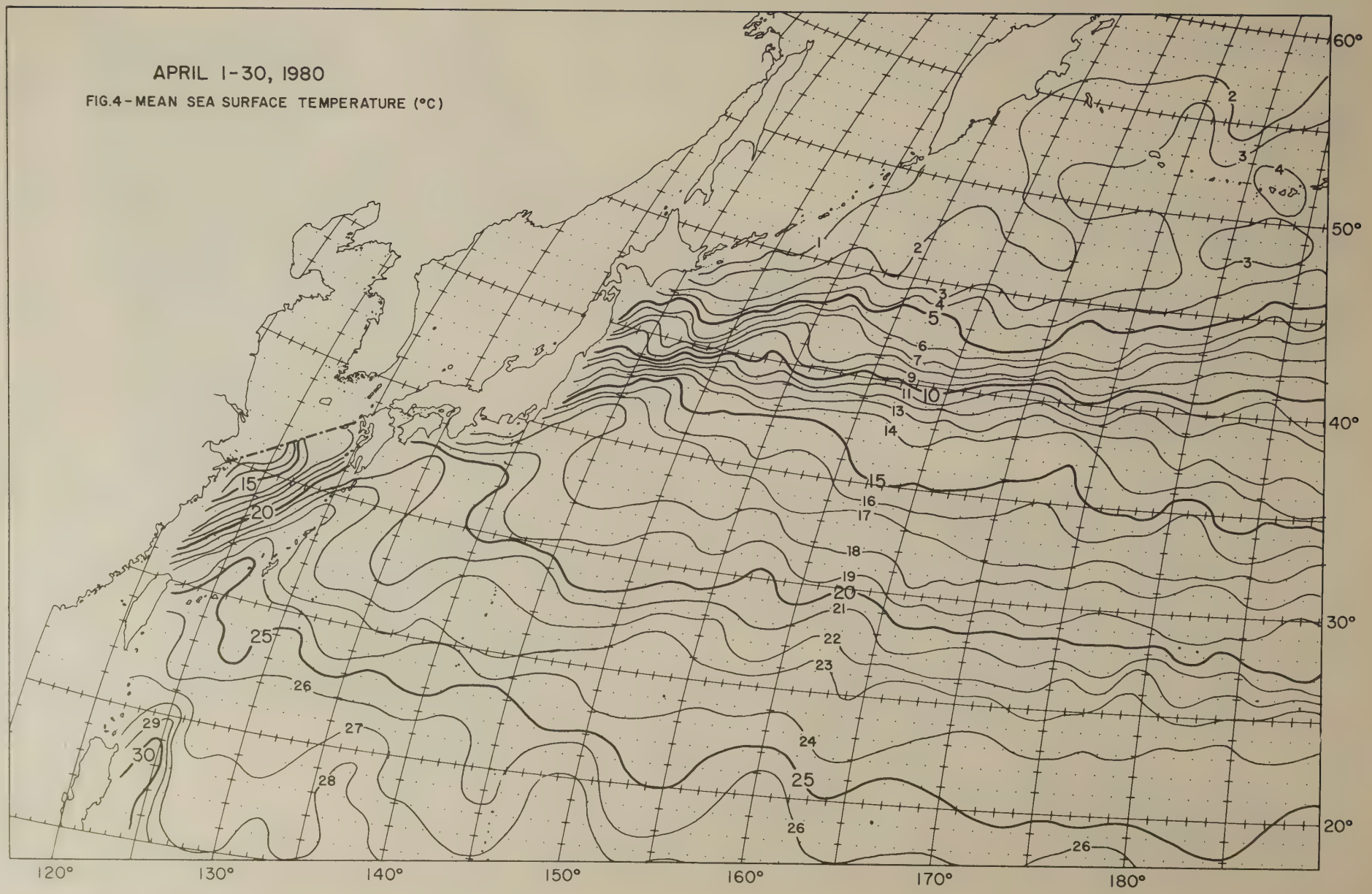
Along the equator the equatorial ocean front was weak (Figure 8), and there were alternating centers of positive and negative SST departures. No well organized pattern of warming had developed in Aril; but the appearance of new centers of positive SST departures more than 1°C east of 130°W was indicative of a marked warming trend. Surface wind speeds were below normal over most of the equatorial zone east of 130°W from the equator to 10°S. An elongated band of SST's more than 1°C above normal extended southeastward from the Galapagos Islands to the central coast of Peru (Figure 9). SST's were more than 2°C above normal off the coast from 9°S to 15°S. The warming over this part of the Peru Current has expanded eastward and northwestward during the past two months. Periodic weakening and westward shifting of the southern high pressure center has been a factor in the increased warming in the southern hemisphere east of 120°W.

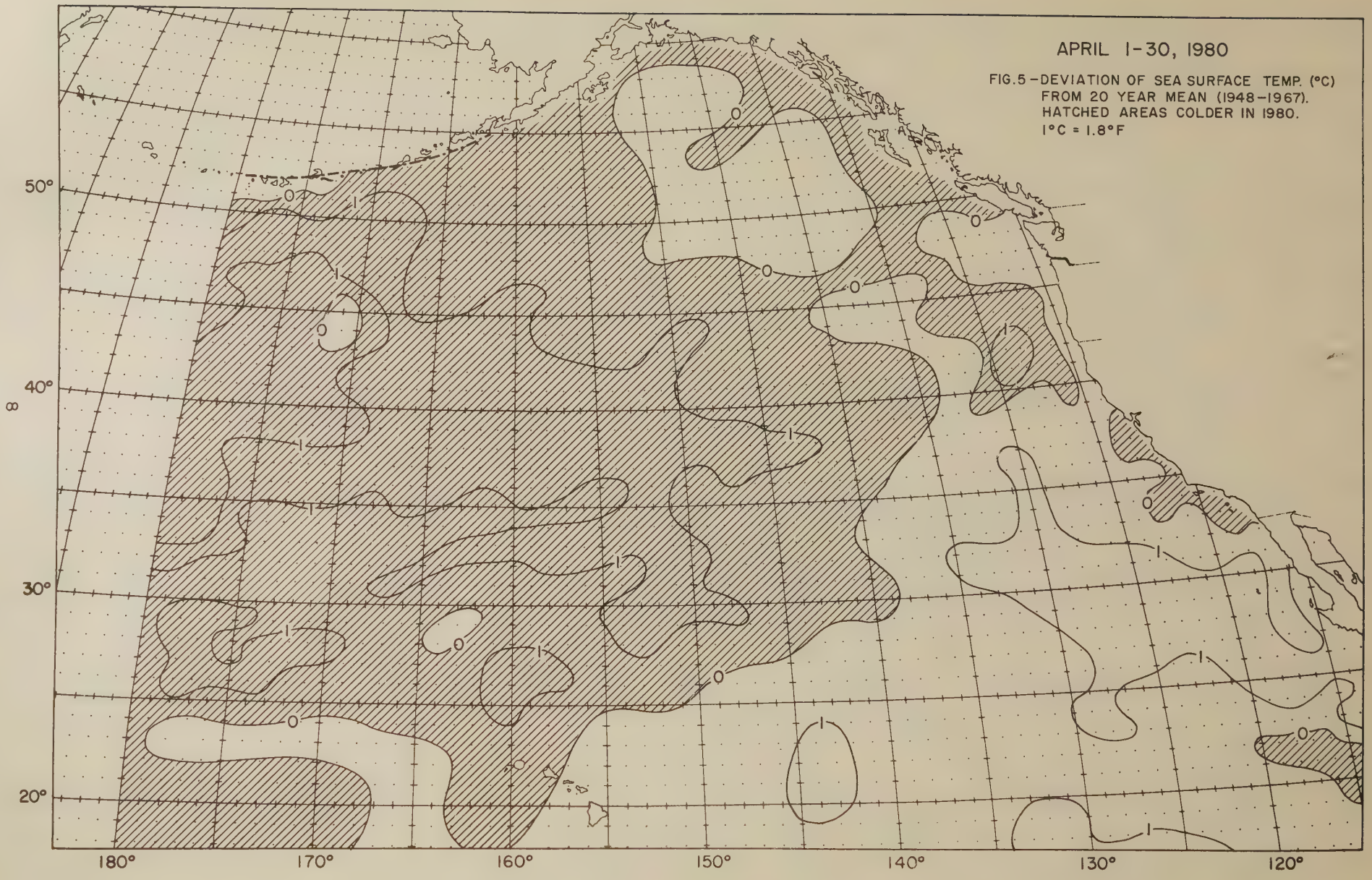
Red tide (noxious marine plankton blooms) have been observed recently at some coastal stations in Peru along with above normal SST's. These recent events indicate that El Niño conditions are developing along the coast of Peru from 5°S to 15°S and spreading along the equator also out to 130°W, particularly south of the equator.

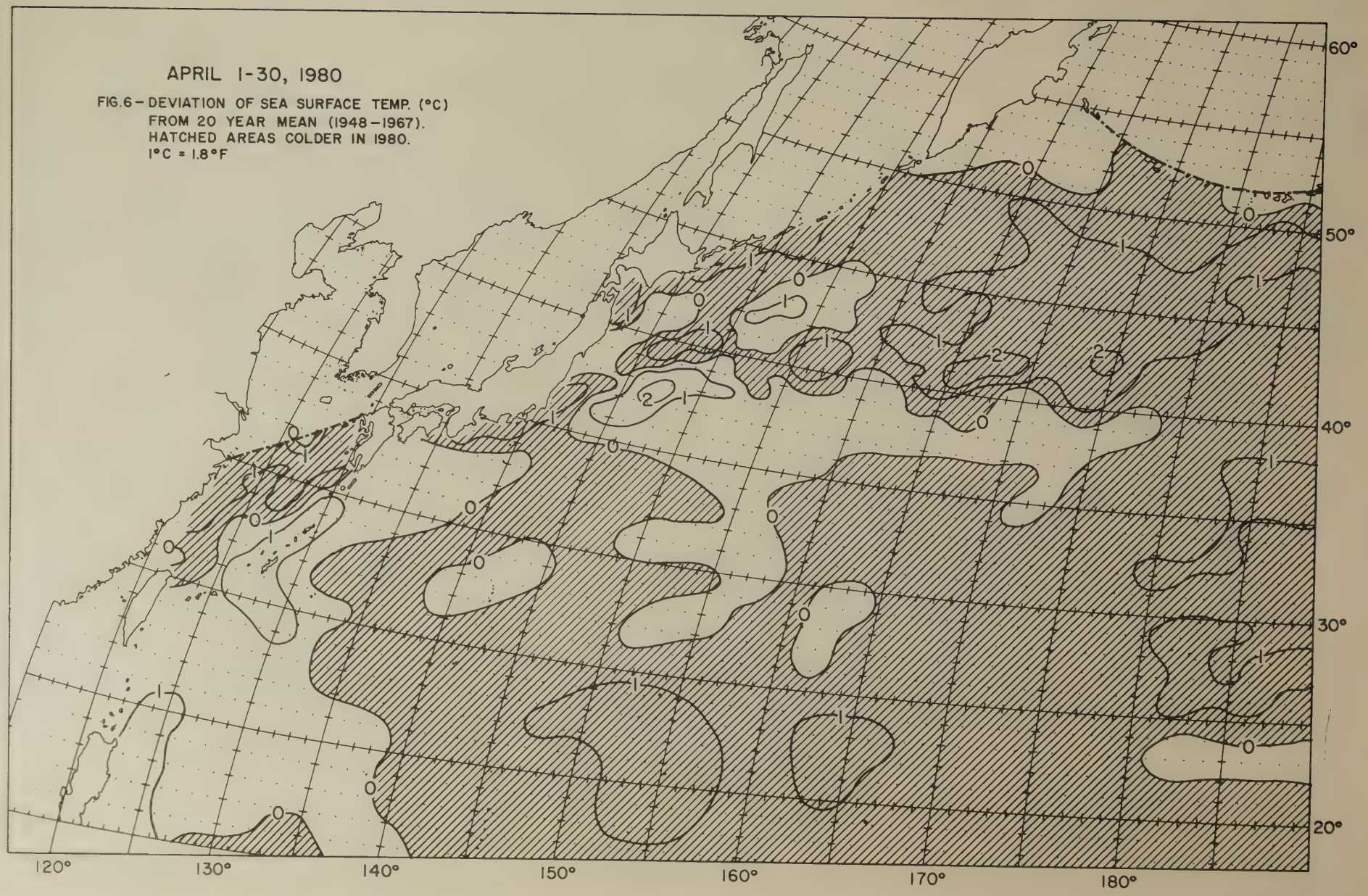

APRIL 1961–1980
FIG. 1—OBSERVED MEAN VALUES
–0000– BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1012
1016
1020
1024
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

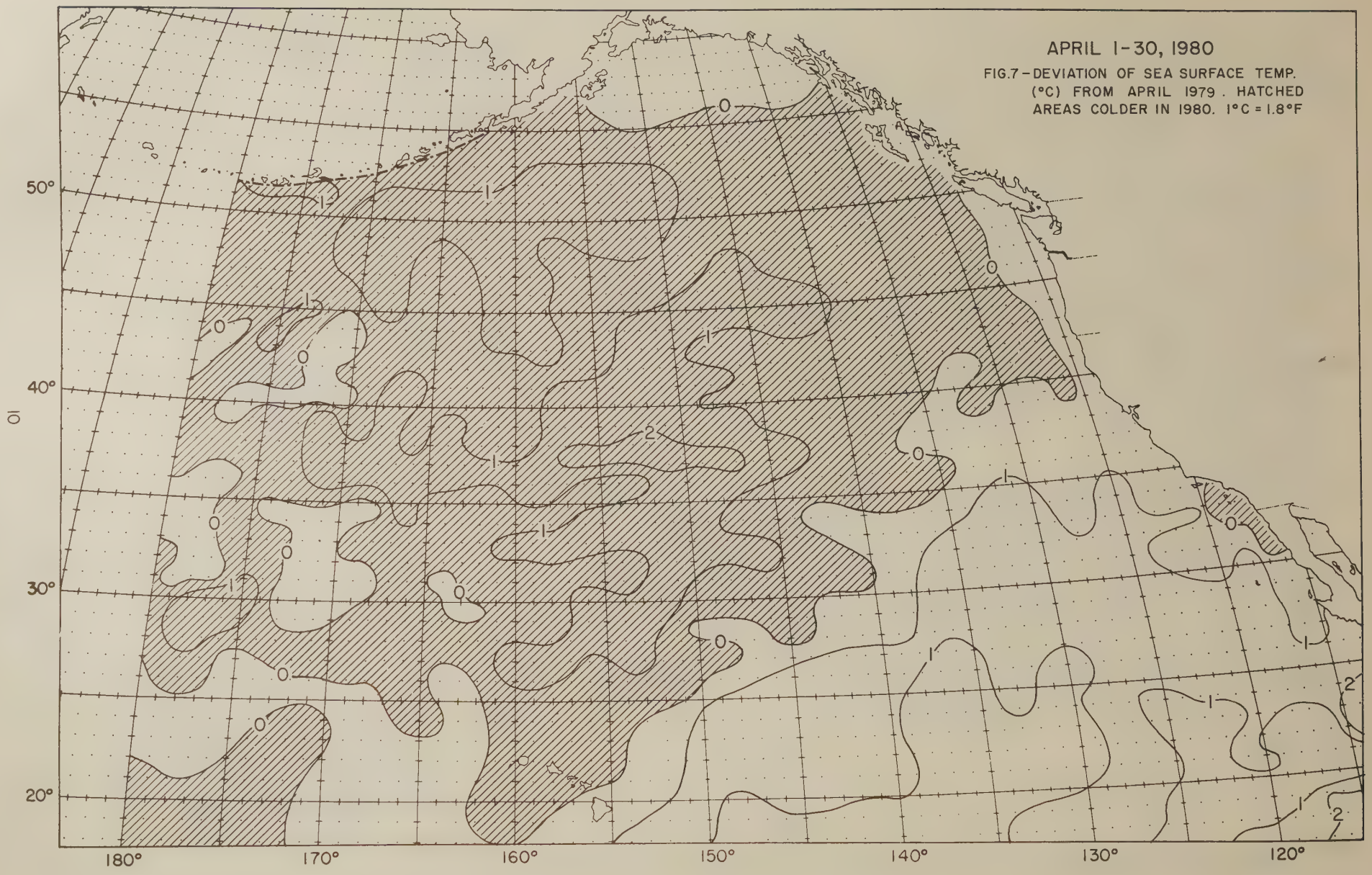

APRIL 1980
FIG. 2 —OBSERVED VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.
996
1000
1004
1008
1012
1016
1020
1024

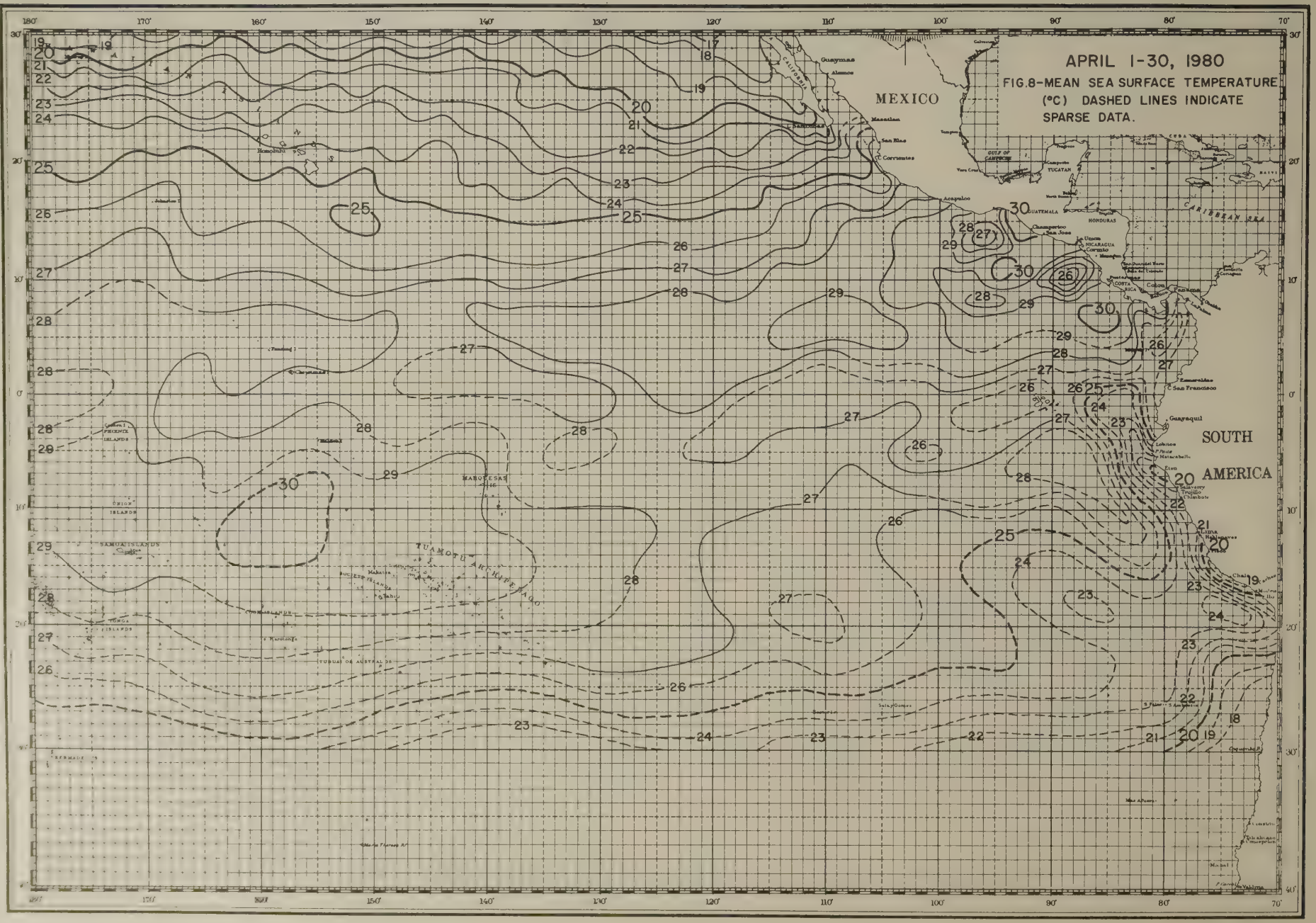

APRIL 1-30, 1980
FIG.3-MEAN SEA SURFACE TEMPERATURE (°C)
7.9
8.2
9.0
10.3
9.7
11.6
15.5
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

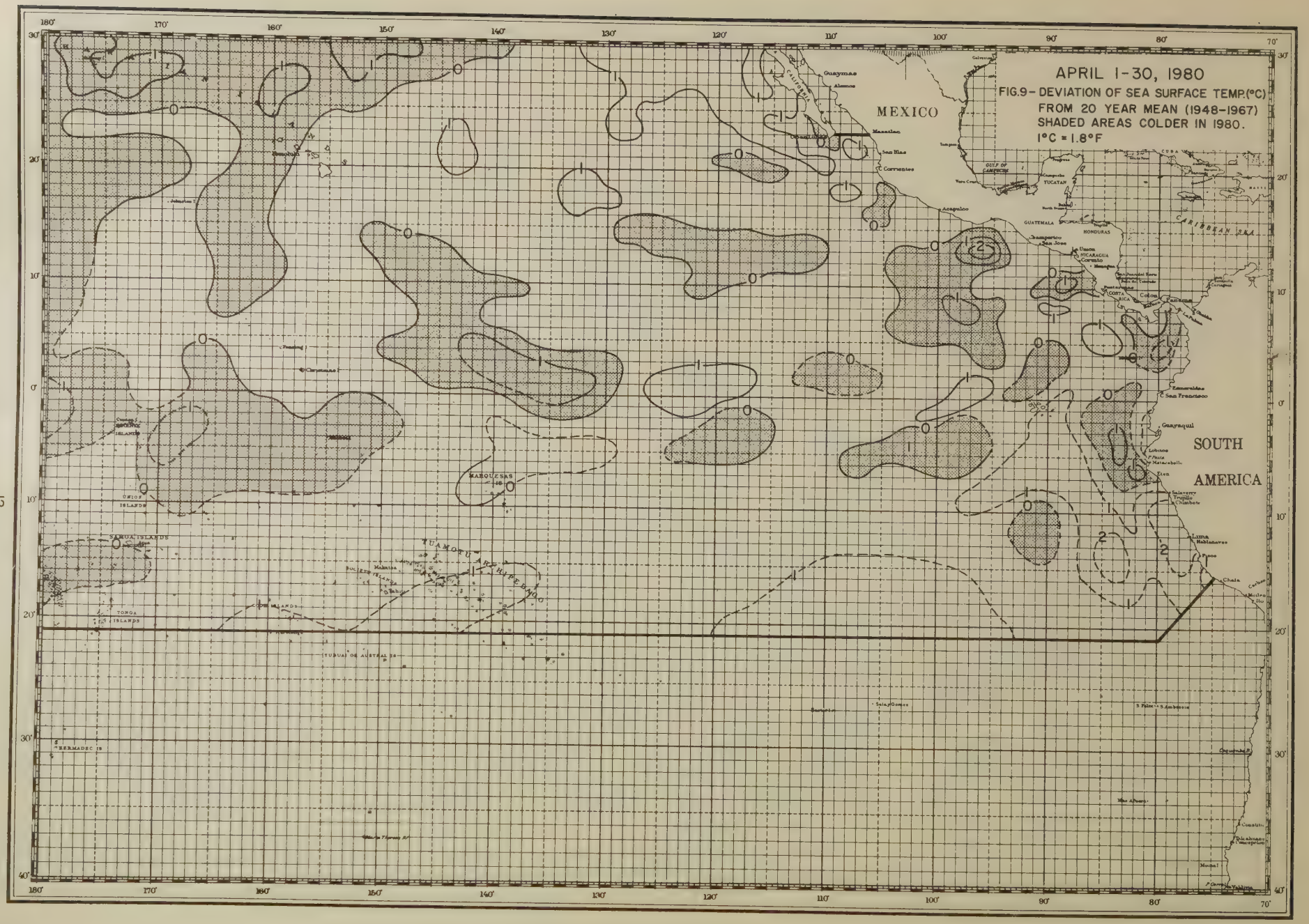

APRIL 1-30, 1980
FIG.4-MEAN SEA SURFACE TEMPERATURE (°C)
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


APRIL 1-30, 1980
FIG.5 – DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948–1967). HATCHED AREAS COLDER IN 1980. 1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
0
1

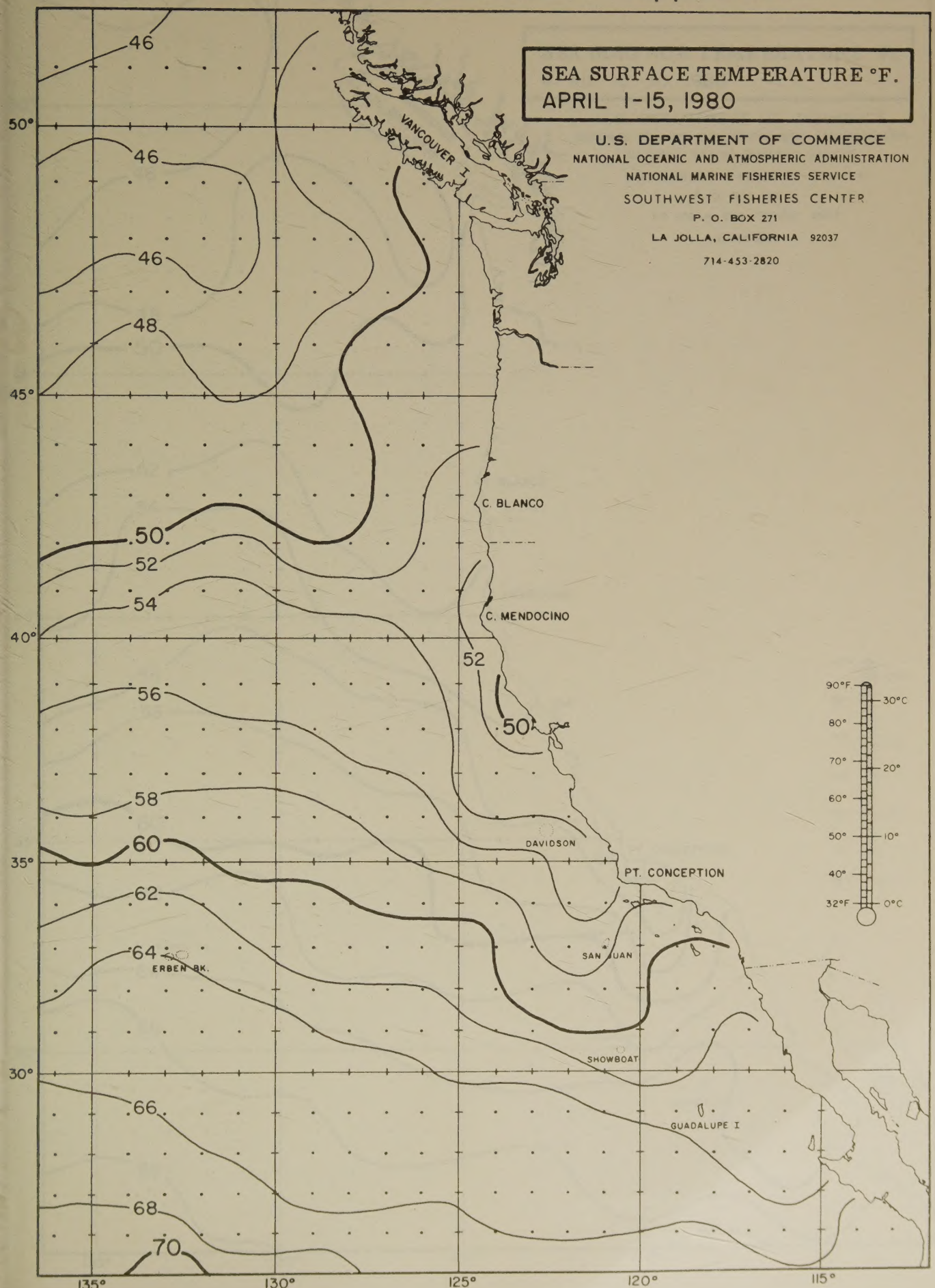

APRIL 1-30, 1980
FIG.6 – DEVIATION OF SEA SURFACE TEMP. (°C)
FROM 20 YEAR MEAN (1948–1967).
HATCHED AREAS COLDER IN 1980.
1°C = 1.8°F
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


APRIL 1-30, 1980
FIG.7 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM APRIL 1979. HATCHED AREAS COLDER IN 1980. 1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
0
1
2


APRIL 1-30, 1980
FIG.8-MEAN SEA SURFACE TEMPERATURE (°C) DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
TUAMOTU ARCHIPELAGO
SAMOA ISLANDS
TONGA ISLANDS
MARQUESAS
Guayaquil
San Francisco
Acapulco
Manzanillo
Salaverry
Trujillo
Chimbote
Callao
Lobitos
Talara
Matacabello
Paita
Tumaco
Esmeraldas
Buenaventura
Chala
Mollendo
Arica
Iquique
Tocopilla
Antofagasta
Coquimbo
Valparaiso
Juan Fernandez Is.
Easter I.
Pitcairn I.
Tahiti
Makatea
Rapa
Raivavae
Rurutu
Tubuai
Rimatara
Rurutaa
Mangareva
Henderson I.
Ducie I.
Oeno I.
Pukapuka
Nassau I.
Suwarrow I.
Rakahanga
Manihiki
Penrhyn I.
Palmerston I.
Aitutaki
Manuae
Mitiaro
Atiu
Mauke
Rarotonga
Penrhyn
Manuae
Niue I.
Fiji Is.
Suva
Nandi
Lautoka
Savusavu
Levuka
Kandavu
Rotuma I.
Wallis I.
Futuna I.
Alofi I.
Uvea I.
Tokelau Is.
Fakaofo
Nukunonu
Atafu
Swains I.
Tutuila
Upolu
Savaii
Manua Is.
Rose I.
Tongatabu
Eua I.
Ha'apai Is.
Vavau Is.
Niuafo'ou I.
Niuatoputapu I.
Minerva Reefs
Kermadec Is.
Raoul I.
Macauley I.
Curtis I.
Gardner I.
Nihoa I.
Necker I.
French Frigate Shoals
Laysan I.
Midway Is.
Kure I.
Johnston I.
Palmyra I.
Jarvis I.
Howland I.
Baker I.
Canton I.
Enderbury I.
Phoenix Is.
Gilbert Is.
Ellice Is.
Marshall Is.
Caroline Is.
Mariana Is.
Guam
Saipan
Tinian
Rota
Yap
Truk
Ponape
Kusaie
Jaluit
Majuro
Kwajalein
Eniwetok
Wake I.
Marcus I.
Bonin Is.
Iwo Jima
Volcano Is.
Ryukyu Is.
Okinawa
Miyako
Ishigaki
Taiwan
Luzon
Manila
Baguio
Aparri
Legaspi
Cebu
Mindanao
Davao
Zamboanga
Palau Is.
Koror
Angaur
Peleliu
Ulithi
Woleai
Ifaluk
Satawal
Lamotrek
Truk
Ponape
Kusaie
Jaluit
Majuro
Kwajalein
Eniwetok
Wake I.
Marcus I.
Bonin Is.
Iwo Jima
Volcano Is.
Ryukyu Is.
Okinawa
Miyako
Ishigaki
Taiwan
Luzon
Manila
Baguio
Aparri
Legaspi
Cebu
Mindanao
Davao
Zamboanga
Palau Is.
Koror
Angaur
Peleliu
Ulithi
Woleai
Ifaluk
Satawal
Lamotrek


APRIL 1-30, 1980
FIG.9- DEVIATION OF SEA SURFACE TEMP.(°C)
FROM 20 YEAR MEAN (1948-1967)
SHADED AREAS COLDER IN 1980.
1°C = 1.8°F
MEXICO
SOUTH
AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
COSTA
RICA
MARQUESAS
ISLANDS
SAMOA ISLANDS
TONGA
ISLANDS
TUAMOTU ARCHIPELAGO
KERMADEC IS
Guaymas
Mazatlan
San Blas
Corrientes
Acapulco
Guayaquil
Salaverry
Trujillo
Lima
Chala
Callao
Iquique
Arica
Tocopilla
Antofagasta
Coquimbo
Valparaiso
Talcahuano
Concepcion
Coquimbo
Easter I.
Juan Fernandez Is.
Sala y Gomez
Marquesas
Tuamotu
Society Is.
Tubuai Is.
Austral Is.
Pitcairn I.
Samoa
Tonga Is.
Kermadec Is.

FISHING INFORMATION – supplement



FISHING INFORMATION – supplement